

Alcohol Quantity and Type on Risk of Recurrent Gout Attacks: An Internet-based Case-crossover Study

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ABSTRACT

OBJECTIVES: Although beer and liquor have been associated with risk of incident gout, wine has not. Yet anecdotally, wine is thought to trigger gout attacks. Further, how much alcohol intake is needed to increase the risk of gout attack is not known. We examined the quantity and type of alcohol consumed on risk of recurrent gout attacks.

METHODS: We conducted a prospective Internet-based case-crossover study in the US among participants with gout and who had at least one attack during the 1 year of follow-up. We evaluated the association of alcohol intake over the prior 24 hours as well as the type of alcoholic beverage with risk of recurrent gout attack, adjusting for potential time-varying confounders.

RESULTS: This study included 724 participants with gout (78% men, mean age 54 years). There was a significant dose-response relationship between amount of alcohol consumption and risk of recurrent gout attacks ($P < .001$ for trend). The risk of recurrent gout attack was 1.36 (95% confidence interval [CI], 1.00-1.88) and 1.51 (95% CI, 1.09-2.09) times higher for >1-2 and >2-4 alcoholic beverages, respectively, compared with no alcohol consumption in the prior 24 hours. Consuming wine, beer, or liquor was each associated with an increased risk of gout attack.

CONCLUSIONS: Episodic alcohol consumption, regardless of type of alcoholic beverage, was associated with an increased risk of recurrent gout attacks, including potentially with moderate amounts. Individuals with gout should limit alcohol intake of all types to reduce the risk of recurrent gout attacks.

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Gout, a crystal-induced arthritis associated with hyperuricemia,¹ is currently the most common inflammatory arthritis, affecting 8.3 million US adults.² Recurrent attacks constitute the main clinical burden of gout. Despite available urate-lowering therapies, the risk of recurrent gout attacks remains high, with the risk of having at least one attack in a year being 69%.³ Strategies to prevent not only disease onset but also recurrent attacks are needed, given the rising incidence and prevalence of gout.^{2,4-6}

Alcohol has been recognized anecdotally as a potential risk factor for recurrent gout attacks. However, most studies to date have focused on alcohol consumption in relation to the risk of initial occurrence of gout.⁷⁻⁹ In a large prospective cohort study, total alcohol consumption was strongly associated with an increased risk of incident gout.⁸ Additionally, the risk of incident gout varied by type of beverage

consumed, with an increased risk observed for beer and liquor but not wine.⁸ However, patients often report wine as a trigger for recurrent gout attacks, and historic depictions of gout often included wine, although this may have been related in part to lead contamination in the Roman era. Previously, we have reported that overall alcohol consumption increased the risk of recurrent gout attacks; however, due to insufficient cases at the time, we were unable to evaluate whether moderate intakes of alcohol and whether specific types of alcoholic beverage were associated with an increased risk of recurrent gout attack.¹⁰ Further, gout treatment guidelines vary regarding recommendations about quantity and type of alcohol intake.¹¹⁻¹³ Clarification of the risk for recurrent gout attacks imparted by specific types of alcoholic beverages would have practical clinical implications for management of patients with established gout.

To address this knowledge gap, we analyzed 724 gout subjects that were recruited prospectively from across the US in an Internet-based study. We used a case-crossover study design to quantify the risk of gout attack in relation to amount of alcohol consumption, particularly moderate intakes, and evaluated whether the effect on recurrent gout attacks varied by consumption of specific type of alcoholic beverage.

METHODS

Study Design

The Boston University online gout study is an Internet-based case-crossover study conducted over the period of 2003-2012 to examine a set of putative risk factors for recurrent gout attacks. The details of the study have been described previously.^{10,14,15} In brief, we constructed a Web site (<https://dcc2.bumc.bu.edu/GOUT>) on an independent secure server within the Boston University Medical Center domain. Recruitment occurred primarily by means of an advertisement on Google linked to the search term "gout." Individuals were directed to the study Web site when they clicked on this link. The study design and timing of exposure assessments are illustrated in **Figure 1**. With this study design, each subject serves as his or her own control. This self-matching eliminates confounding by factors that are constant within an individual but differ among study subjects (eg, sex, race, socioeconomic status).

Study Sample

The study Web site provided information about the study, and for interested potential participants, administered a screening questionnaire that collected sociodemographic information,

gout-related data (eg, features, duration, medications used, number of gout attacks in the prior 12 months), comorbidities, and other medication use. Eligible subjects were those who reported a gout attack within the previous year, were age 18 years or older, were residents of the US, provided informed consent, and agreed to release medical records. We reviewed the medical records and checklist completed by their physician of the components of the American College of Rheumatology (ACR) Preliminary Classification Criteria for Gout.¹⁶ Two rheumatologists (DJH, TN) reviewed all medical records and checklists to determine whether subjects met a diagnosis of gout according to the ACR criteria, using similar methods of confirmation as used in the Health Professional Follow-Up Study.⁸ This study was approved by the institutional review board of Boston University Medical Center.

CLINICAL SIGNIFICANCE

- Episodic intake of any type of alcohol, whether it is beer, wine, or liquor, can increase risk of gout attacks.
- Increasing amounts of alcohol intake of any type, even at moderate levels, can increase risk of gout attacks.
- Clinicians and patients with gout should therefore consider limiting the consumption of all types of alcohol, not just beer.

Ascertainment of Gout Attacks

For each gout attack that occurred during the 1-year follow-up period, we collected the onset date of the attack, anatomical location of the attack, clinical symptoms and signs (maximal pain within 24 hours, redness, swelling), medications used to treat the attack (eg, colchicine, non-steroidal anti-inflammatory drugs [NSAIDs], systemic or intra-articular glucocorticoids), and whether a health care professional was seen for attack management. This method of identifying gout attacks is in keeping with approaches used in gout trials,¹⁷⁻¹⁹ and the provisional definition of flare in patients with established gout that includes only patient-reported elements.²⁰ We additionally restricted our gout attack definitions to those that were treated with at least one gout-related medication typically used to treat attacks (listed above), those with first metatarsophalangeal involvement, those with maximal pain within 24 hours, those with redness, and those with a combination of these features (ie, those with at least 2, 3, or all 4 features).

Ascertainment of Risk Factors

Subjects were queried about the frequency and quantity of a set of putative risk factors (eg, dietary factors, medication use, physical activity, geography) during the 24 hours before that gout attack (hazard period).^{15,21} The same questions also were asked over a 24-hour period when they were attack-free (control period) at study entry (for those subjects who entered the study during an intercritical period), and at 3, 6, 9, and 12 (for those subjects who entered the study at the time of a gout attack) months of follow-up (**Figure 1**).

Standardized questions about alcohol intake included the number of servings of wine, beer (including light

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